

Christian Rohr: The severe flood of 1868 in southeast Switzerland and in northern Italy

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The severe flood of 1868 in southeast Switzerland and in northern Italy – a turning point in water management and prevention policies?

Christian Rohr, University of Bern



Acqua Roma – Nourisher of
Life and Bearer of Meaning

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Outline

- General considerations
 - Historical hydrology
 - Disaster perception
- The flood of 1868
 - An interdisciplinary research project at the Oeschger Centre
 - Historical sources
 - Reconstruction
 - Disaster management
 - Political consequences
 - Further research
- Conclusions

Historical hydrology

- Main issues of natural and engineering sciences
 - Reconstruction of extreme historical events (peak discharge, affected areas)
 - Generation of data to calculate the recurrence probability of extreme floods
 - Definition of endangered areas towards floods
- Social and cultural studies
 - Study of regional and supra-regional adaptation strategies
 - Settlement places
 - Building techniques, flood protection in general
 - Memory cultures
 - Examination of the economic and social impact on society
 - Analysis of historical coping and adaptation strategies (including inappropriate behaviour) to support present-day and future decisions

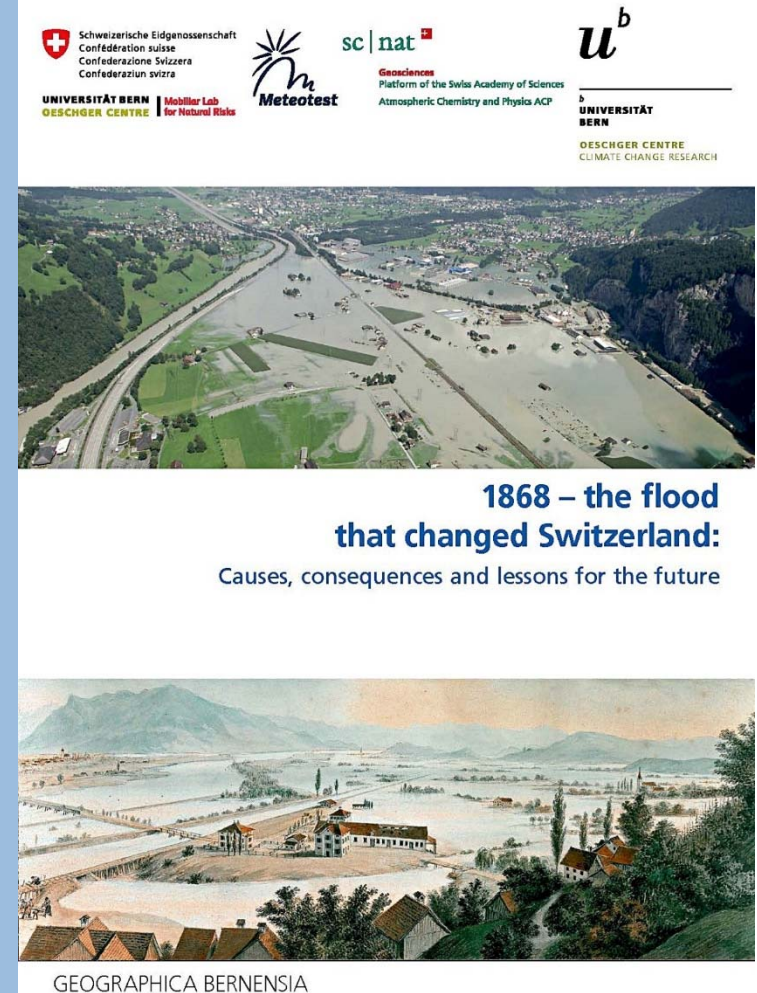
From natural hazards to (natural) disasters

- Cultural history approach asks for the perception, interpretation, (risk) management and memory of natural hazards
- Parameters to perceive a natural hazard as disaster (Rohr 2007)
 - The helplessness of the people trying to cope with the damage with the available means
 - The inability of individuals to explain and understand the event
 - The material and personal suffering
 - The unexpectedness of the event, which depends on how prepared a society is for one-time or recurrent threats
 - Whether there is a series of natural hazards within a short period of time, which can raise the vulnerability of the afflicted people
 - The symbolic connotations and patterns of interpretation, such as connections to natural disasters described in the Bible
 - The general predicament, such as a simultaneous economic, religious and climatic crisis (e.g. during the sixteenth century in Europe)

The flood of 1868

Interdisciplinary research project at the Oeschger Centre

- 150 years anniversary in 2018
- Contributing disciplines
 - Climatology
 - Hydrology
 - Forestry Studies
 - Geology
 - Environmental and Climate History
 - Political Science
- Publication addressed to a wider public (Geographica Bernensia)
 - Available online and in print
 - German, English, French and Italian version



The flood of 1868

Historical sources

- Written sources
 - Local and supra-regional newspapers
 - *Gazzetta Ticinese*
 - *Gazzetta Piemontese* (predecessor of La Stampa)
 - *Bozner Zeitung*
 - Contemporary scientific treatises (e.g. Coaz 1869, Arpagaus 1870)
- Instrumental measurements and other weather observations
 - Swiss national meteorological network (today MeteoSwiss) established in 1863
 - Basic data for climatological and hydrological modelling today
- Pictorial and epigraphical evidence
 - Drawings, early photographs
 - Maps of the inundated areas
 - Flood marks

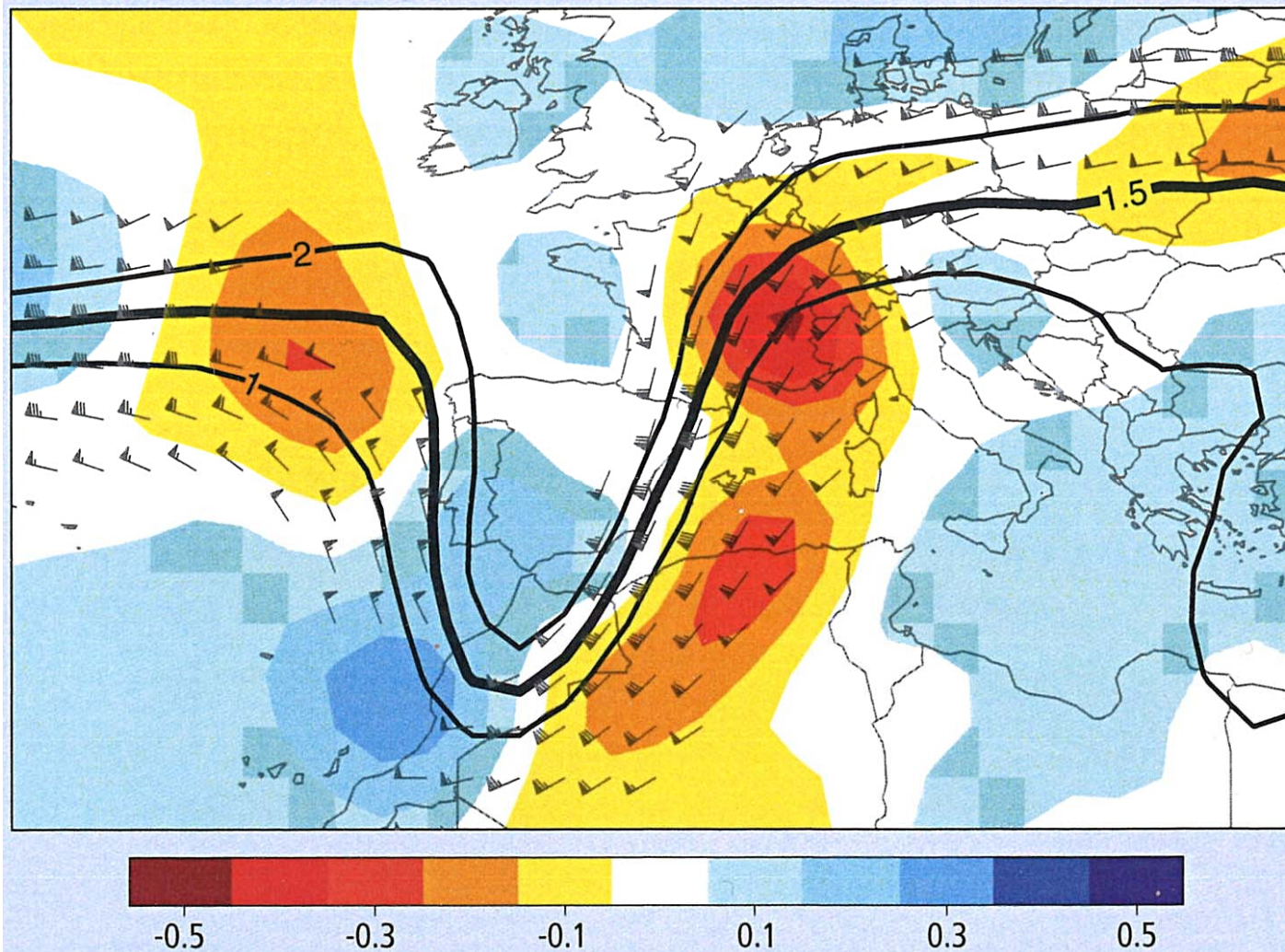
The flood of 1868

Reconstruction

- Heavy rain in late September and early October 1868
 - Massive low pressure weather coming from the western Mediterranean
 - Highest water level of Lago Maggiore in historical times
- Afflicted areas
 - Southern and eastern cantons of the Swiss Federation (Valais, Ticino, Grisons, St. Gall, Uri, Glarus)
 - Southwestern part of the Hapsburg Monarchy (Northern and Southern Tyrol, Trentino)
 - Northern part of the Kingdom of Italy (Piedmont, Lombardy)
- Extreme damage
 - According to C. Pfister (2009) the most expensive catastrophe in Switzerland between 1800 and 1987
 - 51 people killed

The flood of 1868

Reconstruction

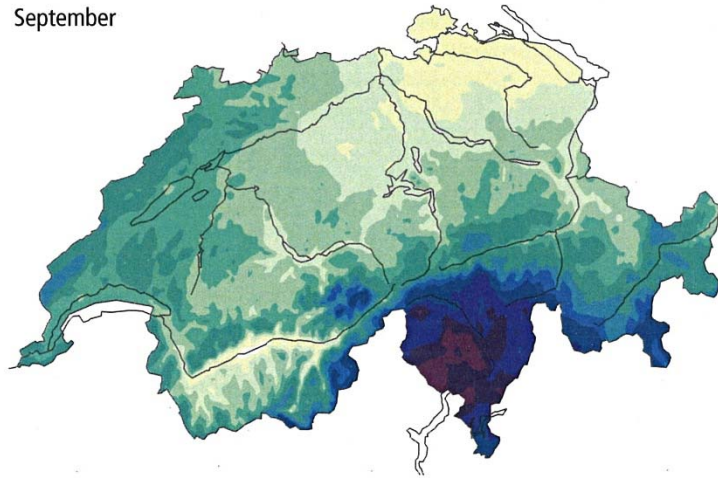


The Weather situation with PV (potential vorticity) streamer on 3 Oct. 1868. Shades of colour show the vertical movement (red means elevation) of the air masses in the middle troposphere (500 hPa). Source: Brönnimann et al. 2018: 9.

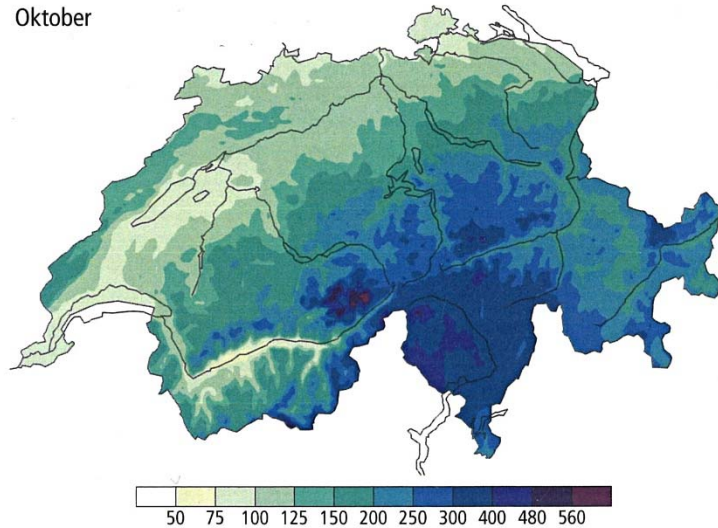
The flood of 1868

Reconstruction

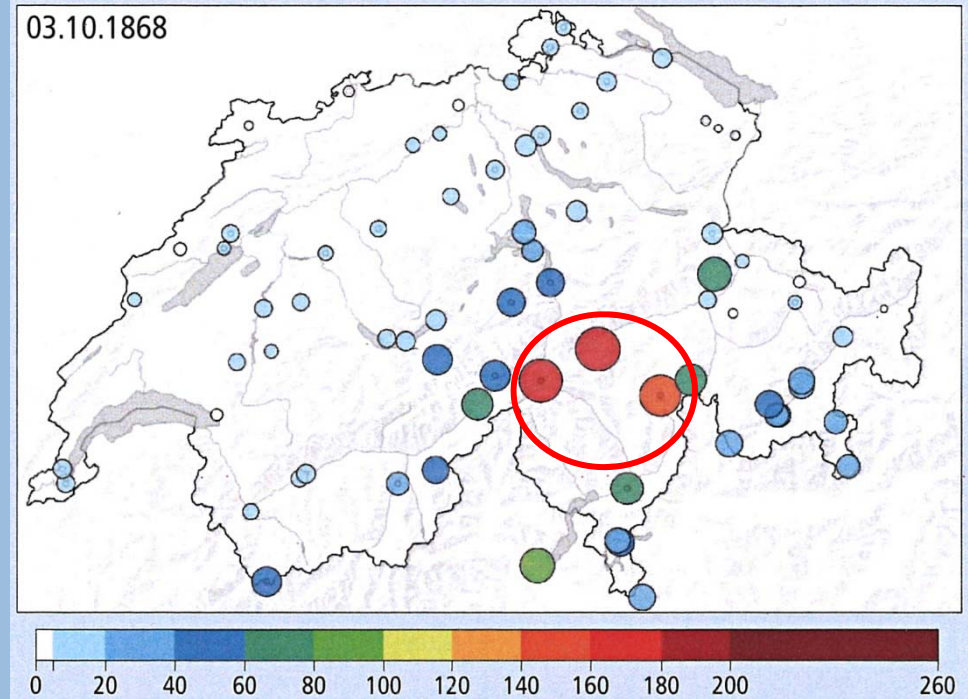
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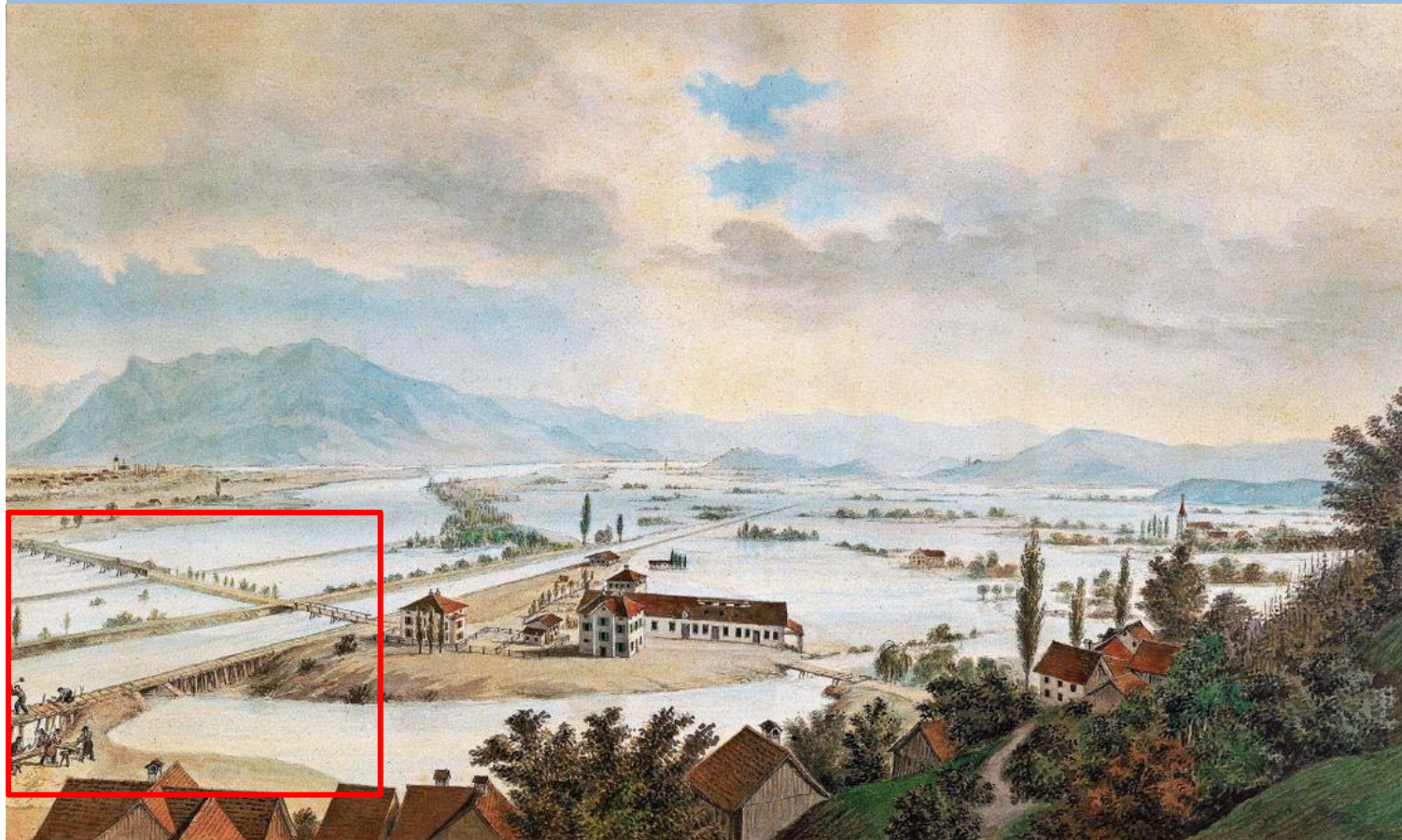
03.10.1868



Precipitation on 3 Oct. 1868 according to the measurements of the Swiss national meteorological network.
Source: Brönnimann et al. 2018: 21.

The flood of 1868

Reconstruction



The flood of 1868 in the Alpine Rhine Valley near Au (SG), anonymous water-colour painting, private collection, 1868.
Source: Copy of the State Archive, St. Gall

The flood of 1868 Reconstruction



The flood of 1868 in Verbania, Lago Maggiore (left), town arcades with flood mark of 4 Oct. 1868 (right), photographs. Source: Brönnimann et al. 2018: 7.

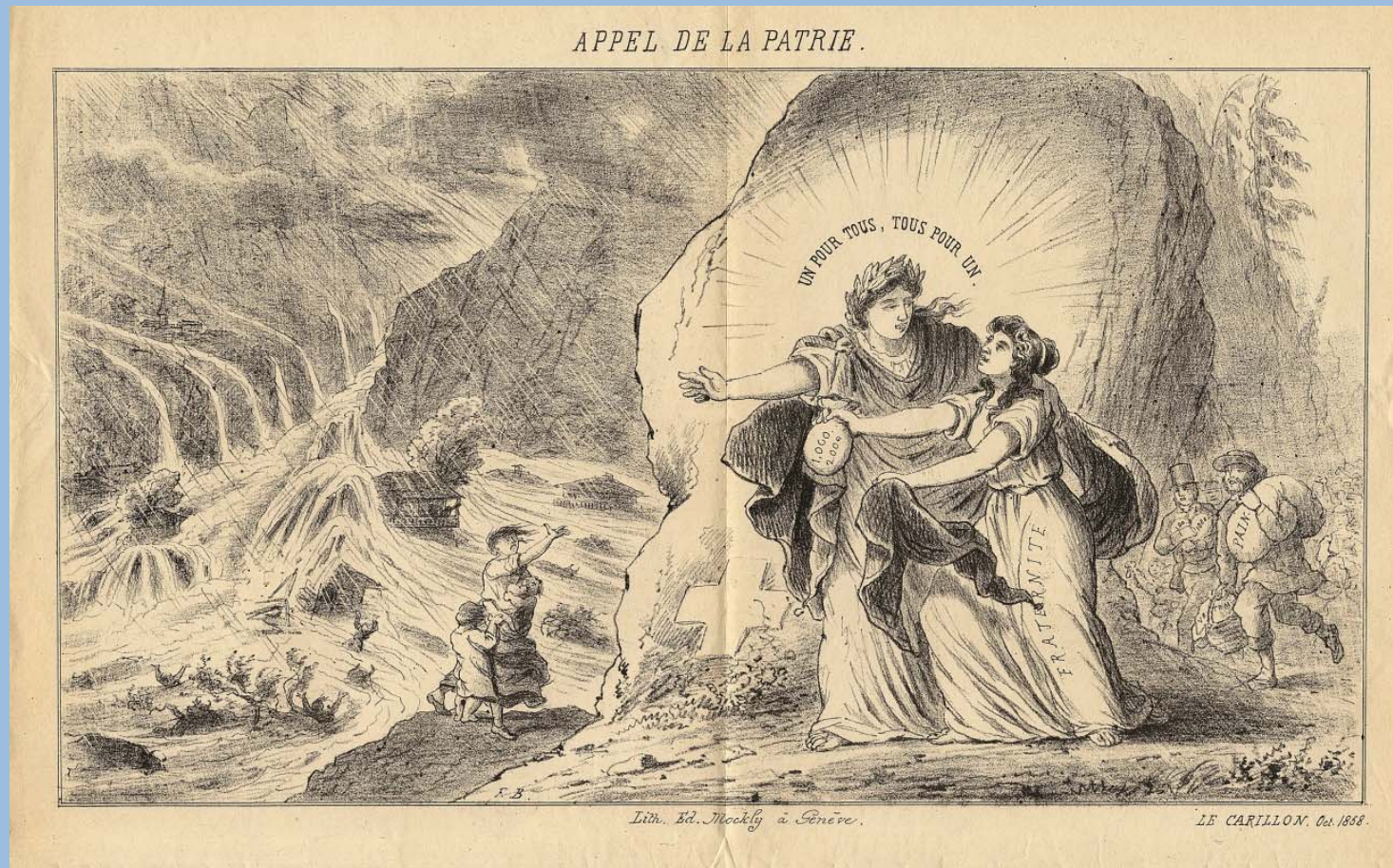
The flood of 1868

Disaster management in Switzerland

- Existing flood prevention ineffective
 - Dams mostly broken
 - Bridges and roads flooded and/or destroyed (help reaches the afflicted areas only several days later)
- High level of solidarity within Switzerland and from abroad
 - Organized by the Swiss Federal Government to improve national coherence
 - Wave of donations (money, food, clothes)
 - Distribution works only partly
- Reconstruction of dams and other water protection starts shortly after the flood
 - “Wuhrmillion” (one million of Swiss Francs for protective measures)
 - Narrow-embankment protection system

The flood of 1868

Disaster management



Etching by Ed. Mockly, Geneva 1868. Source: Schweizerisches Bundesarchiv / Summermatter 2012: 208; Rohr 2018: 30.

The flood of 1868

Disaster management

APPELO
*del Comitato luganese di Soccorso alle vittime
dell'alluvione del 27-28 spirante settembre*

TUTTI I CITTADINI, CONFEDERATI E FILANTROPI.

Alla notizia dei disastri che colpirono la Leventina e le altre valli superiori, la Municipalità di Lugano, facendosi interprete dei sentimenti della intiera popolazione e nell'intento di organizzare e raccogliere pronti ajuti a quegli infelici fratelli, ha eletto noi sottoscritti a costituire un *Comitato di soccorso*.

Grati di tale fiducia non esitiamo ad assumere il generoso mandato; e ci rivolgiamo subito con pari confidenza ai nostri Concittadini e Confederati che sono dentro e fuori del paese natio e a tutti gli uomini sensibili ai dolori del proprio simile.

La sciagura che opprime Leventina e Blenio non ha paragone nella nostra storia; eppure non ne conosciamo ancora tutta l'estensione. Jeri sera appena ci giungevan le notizie di Bodio, or ora bello e florido villaggio, or precipitato nello squallore: tutto il pingue territorio devastato, case, cascine e bestiami travolti dalle acque, e dieciotto vittime umane! Ed oggi solo, tre giorni dopo, ci è dato sapere la rovina di Corzoneso, dove altre ventitrè persone perirono coll'intero casale di Casserio. A Malvaglia altre cinque vittime umane, a Semione altre cinque.

Appeal for aid by the newly founded Aid Committee of Lugano for the support of flood victims in the Leventina and Blenio valleys, merged with a status report from the worst-hit region.

Source: Gazzetta Ticinese, 1 Oct. 1868: 897.

The flood of 1868

Political consequences in Switzerland

- Flood protection and forestry affairs still in the competence of the single cantons
- The deforestation paradigm
 - Swiss Forestry Association (“Schweizerischer Forstverein”) leads a decade-long debate on the consequences of deforestation in the mountains (published in the “Swiss Journal of Forestry”)
 - Deforestation seen as the main reason for floods in the valleys
 - Only the flood of 1868 makes this issue a task for federal and cantonal politicians
- Political consequences
 - Flood prevention and forestry affairs become tasks of the Federal State (Amendment of Art. 24 of the Swiss Federal Constitution, 1874)
 - Swiss Federal Forestry Act on high-Alpine forests (1876)
 - Swiss Federal Hydraulic Engineering Act (1877)

The flood of 1868

The situation outside Switzerland – Further research

- Detailed research only for the Swiss part of the flood of 1868
- Newspaper from Southern Tyrol and Piedmont show the high potential for further studies
 - How did the new Kingdom of Italy react on the floods?
 - Did the Hapsburg administration judge this event only as a regional one without major consequences for flood management in general?
 - Vulnerability of newly built railway routes (e.g. Brenner route from Innsbruck to Verona, opened in 1867)
 - Improvement of the climatological models (currently based on data of the Swiss national meteorological network)

Conclusions

- The flood of 1868
 - Well-examined case study, at least for Switzerland
 - Worst-case, transcending the boundaries of cantons and states
- Consequences
 - Scientific discourse on the impact of deforestation becomes an issue of politics as well
 - Fundamental changes in forestry and flood management legislation
 - Wave of solidarity in Switzerland strengthens the coherence of the Federation
 - Political consequences for the new Kingdom of Italy and for the Hapsburg Monarchy still to be examined

Thank you for your attention!

Christian Rohr

Institute of History
and

Oeschger Centre for Climate Change Research

University of Bern (Switzerland)
christian.rohr@hist.unibe.ch